From Metropolis to Metropolis-Based Region: the Case of Tel-Aviv

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Abstract The decreasing importance of metropolitan areas in the distribution of population and economic activity within many nations of the developed world raises questions about the emergence of agglomeration diseconomies and the associated changes in spatial structure. Here we explore the thesis that a metropolis-based region (MBR), comprising the metropolis and a surrounding territory, has come to replace the metropolis as the appropriate unit of analysis. Using data covering the last 22 years for the Tel-Aviv MBR, various indicators are estimated. These include national and regional deconcentration (both measured in terms of population and employment), as well as centrality, dependence, attractiveness and integration (measured in terms of employment). The main results of the analysis include the following: the need to view metropolitan stagnation and deconcentration within the wider context of the MBR; employment deconcentration occurring at a slower rate than population deconcentration, leading to increasing levels of employment centrality within the MBR; the process of consolidation within the MBR and a strengthening of its economic role within the nation.

1. INTRODUCTION

The stagnation or slow growth of many metropolitan areas in the western world is already an accepted fact. Moomaw and Shatter (1996), for example, show that urban concentration (as measured by various indicators) is generally negatively related to economic growth and to growth in export orientation. Although the overall level of urbanization within a nation may increase as a consequence of economic development, the level of interurban concentration tends to decrease, thus providing a more important role for non-metropolitan peripheries. In the context of the debate about the existence of agglomeration economies and diseconomies (Wheaton and Shishido, 1981), such a trend suggests the emergence of diseconomies at a certain stage in the growth of the metropolis, leading to deconcentration. If such deconcentration actually expands the role of the periphery, this would be consistent with the trends towards spatial redistribution of population and economic activity and interregional convergence, as observed, for example, by Armstrong (1994), Barro and Sala-i-Martin (1991), Fagerberg and Vespagen (1996), Fagerberg, Verspagen and Caniels (1997), Gibbs and Tanner (1997), Malecki (1997).

In approaching this question of deconcentration, we make extensive use of the concept of the metropolis-based region, as developed by McKenzie (1933) and Dickinson (1947) among others. The concept is employed as a methodological device for analyzing metropolitan change under conditions of rapid technological advance, developing communication structures, and continuing globalization. The metropolis-based region (MBR) consists of two component parts: the metropolis or metropolitan part, as customarily defined (termed here the M zone); and a hinterland or surrounding non-metropolitan part (termed the NM zone), extending well beyond the metropolitan fringe, and containing various free-standing urban centres as well as

rural areas. Metropolitan change is considered in terms of the whole MBR, where the system of interaction between the M zone and the surrounding NM zone replaces the more familiar pattern of interaction among different parts of the metropolitan area, itself (Parr, 1999). One technique for analyzing the transition from a metropolis to the MBR involves the use of the population-density function, as applied by Mogridge and Parr (1997) to the case of a London-based region. In this paper, we restrict ourselves to aggregate data for the M zone and the NM zone of the MBR. In so doing, we forego the option of a detailed spatial analysis, but gain the advantage of being able to examine the relationships between the two parts of the MBR, and between the MBR and the rest of the nation.

An important objective of the paper is to examine the process of deconcentration of the Tel-Aviv MBR at both the national and regional scales. National deconcentration involves the decreasing relative importance of the MBR within the nation, while regional deconcentration is concerned with the decreasing relative importance of the metropolis (the M zone) within the much wider MBR. The latter process is not to be confused with the decentralization or suburbanization of the metropolis. In the case of Tel-Aviv this has been continuing for many decades, and is bound to involve the area immediately beyond the boundary of designated M zone. However, our concern is with the shift of population and employment from the high-density M zone to the more territorially extensive NM zone, a development that cannot be treated simply as suburbanization, given the distances involved and the non-continuous nature of growth. We argue that the processes of national and regional deconcentration are due to the influence of agglomeration diseconomies in the M zone of the Tel-Aviv MBR. It is worth mentioning that transportation and communications

improvements (and Israel has certainly benefited from these) are able to facilitate and perhaps hasten the avoidance of agglomeration diseconomies.

Agglomeration diseconomies (or for that matter agglomeration economies) are invariably in the nature of a residual and should therefore be seen in net terms. Thus in the M zone the agglomeration economies may be real enough but, for growing number for firms and households, these are outweighed by the presence of agglomeration diseconomies. It is also the case that while agglomeration diseconomies are mainly confined to the M zone, agglomeration economies are not nearly so spatially restricted, in the sense that firms and households in the NM zone are increasingly able to gain access to the agglomeration economies of the M zone (whether such advantages to the NM zone should be termed agglomeration economies is a moot point, particularly given the long distances involved). To sum up, for the M zone there exist net agglomeration diseconomies (for convenience we use the term 'agglomeration diseconomies'), although this is unlikely to be the case for the NM zone. Moreover, the emergence of independent (net) agglomeration economies at certain favoured locations within this zone is not to be underestimated (Parr, 2002).

The general argument of this paper is organized around the following propositions.

a) Agglomeration economies (broadly defined), which historically led to the growth of the metropolis (the M zone), reach certain levels beyond, which the marginal economic and social costs of agglomeration exceed the marginal benefits. At this point certain of the housing and employment functions of the M zone are transferred to other regions, but others are transferred to the NM zone, encouraging further development of the MBR.

b) The effect of such processes involves a decreasing level of national concentration, as measured by the share of the MBR in national population or employment, and also a decreasing level of regional concentration, as measured by the share of M zone population and employment within the MBR.

c) Population tends to be more sensitive to higher densities than economic activity, and for this reason the decline in growth rates in the M zone can be expected to be more marked for population than for employment. The economic centrality of the metropolis (in terms of the availability of employment in relation to the employed population) can therefore be expected to increase.

d) The increasing growth of population in the adjacent NM zone may attract various types of economic activity from the M zone, thus stimulating the demand for labour and perhaps creating the basis for new agglomeration economies. In this way, the shift of regional population from the M zone to the NM zone of the MBR tends to be followed by the deconcentration of regional employment.

e) The regional deconcentration of economic activity at a slower rate than that for population, together with the emergence of agglomeration economies in the NM zone, leads to an economic fusion of the two zones of the MBR and to a strengthening of its role in the national economy, despite its decreasing share in population and in employment.

2. THE TEL-AVIV MBR: A BACKGROUND

In 1998, Israel had a population of close to 6m, within an area of over 20,000 km^2, distributed across 6 statistical districts (the West Bank and Gaza are not included in Israeli statistics, with the exception of East Jerusalem, which is included in the Jerusalem District). The main urban center is Tel-Aviv, which, together with a few

smaller centers, forms the continuous urban area of Greater Tel-Aviv (the Tel-Aviv District). This has a population of 1.1m, concentrated in an area of 170 km^2 (Table 1). Thus, nearly 20% of the population is concentrated in less than 1% of the area of the nation. The Centre District includes a wide area surrounding the Tel-Aviv District. Its 1998 population is comparable to (but somewhat greater than) that of the Tel-Aviv District, although it is distributed over an area almost 8 times larger. Most of the population is distributed among urban centres.

Table 1 Distribution of Surface Area and Population (1977 and 1998) by District

	Surface Area		Population 1977		Population 1998	
District	Km^2	Percent	Thousands	Percent	Thousands	Percent
Centre	1,242	6	717	20	1,333	23
Tel-Aviv	170	1	976	27	1,139	20
North	3,325	16	560	15	1,014	17
Haifa	854	4	540	15	782	14
Jerusalem	627	3	414	11	709	12
South	14,107	70	435	12	827	14
Nation	20,325	100	3,642	100	5,805	100

We define the MBR as the Tel-Aviv District plus the surrounding Centre District. The Tel-Aviv District represents the M zone of the MBR, while the Centre District represents the NM zone of the MBR, as indicated in Figure 1. The radial dimension of the MBR (defined here in terms of the two statistical districts) varies between approximately 25km and 50km from the centre of Tel-Aviv. The upper limit probably represents the extent of the main commuting field (or daily urban system) of Tel-Aviv. However, this definition of the MBR understates its full extent, particularly in a southerly direction. An alternative definition of the MBR (based on such additional criteria as trade flows, capital movements, and the disengagement by firms and households from the M zone) would involve a somewhat larger area, though not substantially so. Our analysis, however, obliges us to make use of statistical rather

than economic divisions. We therefore have to rely on the somewhat underbounded MBR indicated above, with the result that our primary concern is with labour-market interactions. The other MBRs of Israel are those of Haifa (comprising the North and Haifa Districts), Jerusalem (coinciding with the Jerusalem District) and Beer-Sheva (coinciding with the South District), although the last-named MBR is not fully established. The four MBRs are shown in Figure 1.

3. DISTRIBUTION OF POPULATION

We employ two primary indexes to measure population change within the MBR. The index of national population concentration KN_p is defined as p_{MBR} (the population of the MBR) as a percentage of p_N (the national population), or

$$KN_p = (p_{MBR} / p_N)100 \quad (1)$$

The index of regional population concentration KR_p is defined as p_M (the population of the M zone) as a percentage of p_{MBR} (the population of the MBR), or

$$KR_p = (p_M / p_{MBR})100 \quad (2)$$

Tables 2 and 3 refer to time-series data on population from 1977 to 1998 for the two parts of the MBR and for N, the nation as a whole. Two long-term trends are revealed. The first is that the index of national population concentration KN_p decreases over time (Table 2). The second trend is that population in the M zone (the Tel-Aviv District) is barely increasing and has practically stagnated over the last few years, while that of the NM zone (the Centre District) is increasing rapidly (Table 3). Consequently, the relative importance of the NM zone in the MBR continues to increase, causing the index of regional population concentration KR_p to decrease (Table 2). Note that the decrease in KN_p is due to the fact that the decreasing share of

national population in the M zone was not fully compensated by an increasing share in the NM zone. This decline in KN_p reflects the familiar tendency of 'polarization reversal' which has been observed in many other developed nations (Vining and Kontuly, 1978; Vining and Pallone, 1982).

Table 2 Percentage Share of Population in the Nation, two Zones of the Tel-Aviv MBR and Indexes of National and Regional Population Concentration (for Selected Years)

	1977	1984	1990	1995	1998
NM	20	21	22	22	23
M	27	25	23	21	20
N	100	100	100	100	100
KN_p	47	46	45	43	43
KR_p	58	54	52	49	47

Table 3 Population in 1977 and 1998 and Percentage Population Growth in Nation, Tel-Aviv MBR and its two Zones (by Period)

	Population (Thousands)		Average Geometric Growth Rate Per Annum				
	1977	1998	1977-98	1977-84	1985-90	1991-95	1996-98
NM	717	1,333	3.0	2.5	2.5	3.1	3.8
M	976	1,139	0.7	0.5	0.9	1.2	-0.1
MBR	1,694	2,472	1.8	1.4	1.6	2.2	1.9
N	3,642	5,805	2.2	1.7	1.9	2.8	2.4

Note: Growth rates are expressed as percentages

The data in Table 3 (and certain other tables) are arranged according to four different time periods. The first is 1977-84, the period before the national economic stabilization program was implemented. The second period, 1985-90, covers the first years of the economic stabilization program, and witnessed a sharp decline in inflation rates and a policy of economic liberalization. The third period, 1991-95, was characterized by a very rapid population growth as a result of a mass migration mainly from the former USSR and Eastern Europe, by progress in the peace process, and by a high level of economic growth. The fourth period, 1996-98, was one of declining migration to Israel, difficulties in the peace process, an economic slowdown

and increasing unemployment. During each of these periods, the population growth rate in the M zone was consistently lower than that of the nation, while that of the NM zone was higher.

The decreasing share of the MBR in the national population (the decreasing value of KN_p in Table 2) can be explained both by lower levels of natural increase and by a negative balance in internal migration, as defined by the number of persons who change residence among the districts within Israel. A third element that influences changes in the share of population is external migration (from other nations to Israel). At certain periods, such as in the first years of the 1990s, massive waves of immigration represented a significant component of population change. In the last few years, however, the external migration balance stabilized at around 50,000, as compared with around 250,000 internal migrants among the districts. No data are available about the regional distribution of migrants from other nations at the time of their arrival, so that this component is not considered here.

The data on internal migration show an interesting picture of the dynamics of population flows. The migration balance represents the difference between population that moves to a district and the population that leaves the district, per thousand resident population in the district. The following features emerge from Table 4. First, the internal migration balance for the MBR is generally low, with a tendency towards positive values until 1990, and negative values during the last decade. The period 1991-95 shows a clear tendency of net migration from the M zone to other locations, a typical indication of the trend towards 'polarization reversal' mentioned above. Second, the M zone of the MBR continued lose population: the internal migration balance has been negative throughout most of the last 22 years. Since 1990 this negative trend has increased dramatically. The negative migration balance of the M

zone may reflect an interesting phenomenon which is not investigated here: some of the external migrants, who came with the massive migration wave from the former USSR and temporarily settled with family or friends in the M zone, moved at a later stage to permanent residences in the NM zone and in other regions, where house prices were more affordable. Third, most of the population leaving the M zone appears to go to the NM zone: the internal migration balance for this latter zone has been positive for every year, with a sharp increase during the last few years. An analysis of the inter-district migration data for year 1993 shows that the major share (around two thirds) of the migrants coming into the NM zone came from the M zone (Israel, 1997, Table 9). Migrants leaving the M zone go mainly to the NM zone, but a significant share goes to the South District, and of those who leave the NM zone, more go to the South District than to the M zone.

Table 4 Average Annual Internal Migration Balance per Thousand Resident Population in the Tel-Aviv MBR and its two Zones (by Period)

	1977-98	1977-84	1985-90	1991-95	1996-98
NM	8	8	6	6	18
M	-7	-3	-2	-14	-18
MBR	0	2	2	-4	1

Concluding this section, we can clearly see the existence of a process of both national and regional population deconcentration. The MBR is losing its share of national population, with a slow but continual decrease over the years. This is due to a much lower level of natural increase than in other parts of the nation, which is not offset by migration into the MBR. The relatively smooth and slow trend of national population deconcentration contrasts with the more dramatic trend in regional population deconcentration: the M zone of the MBR continues to experience a declining share of MBR population, because of low rates of natural increase, and because of a negative migration balance with other areas, most notably with the NM

zone of the MBR. The strengthening of the NM zone in relation to the MBR, and even in relation to the nation is wholly attributable to its positive migration balance, rates of natural increase being relatively low.

4. DISTRIBUTION OF WORKFORCE AND EMPLOYMENT

In this section we consider the development of the Tel-Aviv MBR in terms of w_{MBR} (workforce or regional labor supply) and e_{MBR} (employment or regional labor demand), and how each changes over time in relation to its national counterpart. In 1998, the share of the MBR in the national workforce was higher than its share in national population. This was due to two major factors. The first involved differences in the age distribution. The share of the population of employable age (15 years or older) was higher in the MBR than in any other district: it was 78% in the M zone and 73% in the NM zone, as compared with a national average of 71% (Israel, 1999, Table 2.10, pp. 2-22). The second factor was related to the higher rate of participation in the workforce of the MBR: 55% in the M zone and 56% in the NM zone, as compared with 54% in the nation. As a consequence of these two factors the share of the MBR in the total national workforce was 47%, as compared with its lower share in population, 43%.

We now examine changes in employment in the MBR by means of indexes of national and regional concentration. The index of national employment concentration KN_e is defined as e_{MBR} (employment within the MBR) as a percentage of e_N (total employment within the nation), or

$$KN_e = (e_{MBR} / e_N)100 \qquad (3)$$

By contrast, the index of regional employment concentration KR_e is defined as e_M (employment within the M zone) as a percentage of e_{MBR} (employment within the MBR), or

$$KR_e = (e_M / e_{MBR})100 \quad (4)$$

The changes in levels of national and regional employment concentration over the period are indicated in Table 5, where both indexes display decreases over the period. Table 6 shows the growth rates of the workforce and employment for the nation, the MBR and its two zones, over different time periods.

Table 5 Percentage Share of Employment in Nation and the two Zones of the Tel-Aviv MBR, and Indexes of National and Regional Employment Concentration (for Selected Years)

	1977	1984	1990	1995	1998
NM	18	20	19	20	22
M	32	31	31	30	28
N	100 (1,122)	100 (1,287)	100 (1,409)	100 (1,908)	100 (2,012)
KN_e	51	51	50	50	49
KR_e	64	60	62	60	56

Note: Figures in parentheses refer to total national employment in thousands

Table 6 Percentage Average Geometric Growth Rate per annum of Workforce *w* and Employment *e* in the Nation, the Tel-Aviv MBR and its two Zones (by Period)

	1977-98	1977-84	1985-90	1991-95	1996-98
w_{NM}	3.9	4.5	1.7	4.5	4.4
e_{NM}	3.6	3.4	0.4	6.2	4.1
w_M	1.5	0.6	1.9	2.8	-0.2
e_M	2.1	1.1	1.8	4.3	-0.3
w_{MBR}	2.6	2.3	1.8	3.6	2.1
e_{MBR}	2.7	2.0	1.3	5.0	1.6
w_N	2.9	2.6	1.9	4.1	2.5
e_N	2.8	2.0	1.5	5.2	1.8

Throughout the period, employment increased in the NM zone of the MBR at a slightly lower rate than the workforce. However, a more detailed analysis of the data

by periods reveals an important trend. Until 1990 employment in the NM zone grew at a significantly lower rate than the workforce, reflecting a process of housing deconcentration from the M zone to the NM zone, with commuting to the M zone. From 1990 we see a reversal of this process: employment in the NM zone increased at a higher rate than that of the workforce, particularly during the period of rapid national growth between 1991 and 1995. The relative share of the NM zone in national employment increased from 18% in 1977 to 19% in 1990 and to 22% in 1998, reflecting a process of regional employment deconcentration within the MBR or a more equal distribution of employment or labour demand between the two zones of the MBR. We may conclude that the NM zone of the MBR behaves first as a dependent economy, absorbing population and relying on the metropolis for employment, but at a later stage (probably after certain thresholds have been reached) it develops certain of the characteristics of a metropolitan economy. This is consistent with expectation, and parallels the experience of Western Europe and North America.

The findings of this section and the preceding one suggest several conclusions. First, the processes of national and regional population deconcentration should be regarded as distinct. However, both are probably due to agglomeration diseconomies, which encourage migration from the M zone to the adjacent NM zone and from the MBR to other regions, although this conclusion is still in the nature of an hypothesis. Second, the processes of national and regional employment deconcentration are relatively slow, and necessarily follow the spatial changes in population. Third, there is little sign of an employment-led deconcentration process, either nationally or regionally: employment responds to population movement, whereas population does not appear to respond to the movement of employment. Less formally stated, it is a case of ‘jobs following people’ rather than ‘people following jobs’.

5. CHANGES IN INTER-REGIONAL AND INTRA-MBR LABOUR MOBILITY PATTERNS FOR THE TEL-AVIV MBR

The fact that changes in the distribution of population are not similar to changes in the distribution of employment implies an evolution in the dynamics of inter-regional and intra-regional employment mobility (in terms of labor commuting between regions). We identify these changes, first in terms of the relationships between the MBR and other regions, and then in terms of relationships within the MBR.

Centrality, Dependence, Attractiveness and Integration of the MBR

Four indicators are employed in the identification of changes in employment structures: centrality, dependence, attractiveness and integration. The economic role of the MBR in the national space is defined and measured in terms of these indexes.

Centrality is defined as employment in the region as a percentage of the employed resident workforce of the region, or

$$C_i = (e_i / y_i)100 \tag{5}$$

where: C_i is the centrality index for region i (the entire MBR); e_i is the employment in region i; and y_i is the number of employed workers who reside in region i (whether they are employed in region i or in another region). A value of C_i greater than 100 indicates that the level of employment in region i is higher than the number of employed workers who reside there. A value below 100 indicates that the level of regional employment is insufficient to meet the employment requirements of the regional workforce.

Dependence is defined as the number of resident workers in a region who are employed beyond its boundaries, as a percentage of its employed workforce, or

$$D_i = (y_{ij} / y_i)100 \quad (6)$$

where: D_i is the dependence index for region i in relation to region j (for the sake of simplicity, region j is taken to be the entire nation outside region i); y_{ij} is the number of resident workers in region i who are employed in region j; and y_i is the employed workforce resident in region i.

Attractiveness is defined as the number of workers commuting to a region from another region, as a percentage of total employment in the region to which they are commuting, or

$$A_i = (y_{ji} / e_i)100 \quad (7)$$

where: A_i is the attractiveness index for region i; y_{ji} is the number of workers commuting from region j to region i (as noted above region j represents the entire nation outside region i); and e_i is the employment in region i.

Integration is defined as the total level of commuting into and out of a region, as a percentage of the employed workforce of that region, or

$$I_i = [(y_{ij} + y_{ji}) / y_i]100 \quad (8)$$

where: I_i is the inter-regional integration index for region i; y_{ij} is the number of workers commuting from region i; y_{ji} is the number of workers commuting to region i; and y_i is the employed workforce resident in region i.

Table 7 presents the values of the four indexes for the whole MBR at five different years. As can be seen, the centrality index increases throughout the whole period, and it will be shown below, that this 'metropolization' effect applies to the whole MBR and not simply the M zone. Turning to the dependence of the MBR on employment opportunities outside the MBR, this was higher in 1977 than its

attractiveness for employment among workers from other regions. It will be shown below that this was mainly due to the fact that at this time the NM zone of the MBR was heavily dependent upon employment in other regions. Over the years there has been a continuous trend of decreasing dependence and increasing attractiveness of the MBR. The decrease in the dependence index occurred mainly during the 1990s, while the increase in the attractiveness index began as early as the mid-1980s. This latter development contributed to a higher level of integration of the MBR with the other regions, and occurred mainly as a result of workers commuting into the MBR and (to a smaller and decreasing extent) workers commuting from the MBR. The continuously increasing value of the integration index, along with the decline of the MBR's relative importance in population and employment, point to an important conclusion, namely, the decline of MBR's relative share of population and workforce in no sense reflects a deterioration in the economic position of the MBR. On the contrary, the increasing value of the integration index (together with other indexes, particularly the centrality index) indicate a stabilization of population, but also a strengthening of the economic role of the MBR as an integral part of the national economy.

Table 7 Indexes of Inter-Regional Labour Mobility Patterns in Region *i* (the Tel-Aviv MBR) for Selected Years

	1977	1984	1990	1995	1998
Centrality C_i	97	97	98	102	103
Dependence D_i	6	6	6	4	4
Attractiveness A_i	3	3	4	6	7
Integration I_i	9	8	10	11	12

Intra-MBR Dynamics

The differing roles of the two parts of the MBR provide an economic explanation of employment changes over time, which result from the changing balance in

population and from the increasing agglomeration in the M zone. Emphasizing the commuting aspect, we analyze these roles by applying the earlier-discussed concepts of centrality, dependence, attractiveness and integration to the MBR. In the cases of centrality, dependence, and attractiveness, the term region *i* in equations (5) to (8) is now replaced, as appropriate, by the NM zone or the M zone, while region *j* is replaced by the rest of the nation outside the zone in question, or by the other zone of the MBR, or by the rest of the nation outside the MBR. In the case of integration, region *i* is replaced by either the NM zone or the M zone of the MBR, with region *j* being replaced by the other zone.

Table 8 summarizes the key aspects of intra-MBR employment structures in terms of centrality and dependence. For the NM zone the centrality index, representing local employment as a percentage of employed resident workforce zone, decreased until 1990 (indicating a shift of residence to the NM zone from the M zone but with a continuation of employment there), but increased thereafter (indicating an economic strengthening of the NM zone). In the M zone the centrality index has continued to increase, reflecting a change in its role from a location of population and employment to a location of employment. As noted earlier, the centrality index of the MBR as a whole continued to increase.

Table 8 also presents the dependence indexes for the NM zone and the M zone. For a given zone the overall dependence index (shown in italics) is equal to the value of that zone's dependence index with respect to the other zone, plus the value of its dependence index with respect to all regions outside the MBR. It can be seen, for each zone of the MBR there is an increasing tendency to depend on the other zone, but also a decreasing tendency to depend on other regions, as argued above. This process was accentuated during the 1990s. Until 1990 an increasing share of the workers of NM

zone found employment outside this zone, but mostly in the M zone. From 1977 to 1990 the dependence index (for the NM zone) with respect to the M zone increased, while the dependence index with respect to other regions stabilised. After 1990, however, the dependence index with respect to the M zone stabilized, while the dependence index with respect to other regions decreased. These changes indicate an intensification of economic relationships within the MBR, or the formation of a more internally interconnected metropolitan region. The trend is also supported by the commuting patterns of workers in the M zone: not surprisingly perhaps, higher shares of them prefer commuting to the NM zone than to locations outside the MBR. From 1977 to 1998 the dependence index (of the M zone) with respect to the NM zone increased, while the dependence index with respect to other regions remained the same, although it had displayed an increase during the intervening years.

Table 8 Centrality and Dependence Indexes for the two Zones of the Tel-Aviv MBR (for Selected Years)

	1977	1984	1990	1995	1998
Centrality of NM zone	85	81	78	82	83
Centrality of M zone	105	110	103	119	123
Overall dependence of NM zone	*30*	*31*	*35*	*33*	*32*
Dependence on M zone	22	24	27	27	27
Dependence on other regions	8	7	8	6	5
Overall dependence of M zone	*13*	*13*	*13*	*13*	*15*
Dependence on NM zone	9	9	9	10	11
Dependence on other regions	4	5	5	3	4

Note: Overall figure (in italics) may slightly differ from the sum of the two dependence components, because of rounding

The attractiveness dimension is concerned with the origin of the workers employed within each zone. Table 9 presents the attractiveness indexes for the NM zone and the M zone. The overall attractiveness index for a given zone (shown in italics) is equal to the value of that zone's attractiveness index with respect to the other zone, plus the value of its attractiveness index with respect to all regions outside

the MBR. Within the NM zone, population growth is accompanied by an almost parallel growth of employment, creating jobs for the growing workforce there, as well as attracting increasingly more workers from outside the MBR. From 1977 to 1998 the attractiveness index (of the NM zone) with respect to the M zone decreased, this being offset by an increase in the attractiveness index with respect to other regions. The NM zone thus appears to be behaving in a 'metropolitan' manner. By contrast, in the case of the M zone, it is not overstating the point to claim that this is becoming less a balanced metropolitan area and more a location for employment, largely as a consequence of population stagnation. From 1977 to 1998 the overall attractiveness index (of the M zone) increased, with the attractiveness indexes with respect to the NM zone and with respect to other regions both increasing.

Table 9 Attractiveness Indexes for the two Zones of the Tel-Aviv MBR and Integration Index (for Selected Years)

	1977	1984	1990	1995	1998
Overall attractiveness of NM zone	*18*	*15*	*17*	*19*	*20*
Attractiveness for M zone	15	12	12	12	11
Attractiveness for other regions	3	3	5	7	8
Overall attractiveness of M zone	*17*	*22*	*25*	*28*	*31*
Attractiveness for NM zone	14	19	21	22	25
Attractiveness for other regions	3	2	4	6	6
Intra-MBR integration index	14	16	17	18	20

Note: Overall figure (in italics) may slightly differ from the sum of the two attractiveness components, because of rounding

The increase of intra-MBR labour flows (discussed above with regard to dependence) is reflected in the intra-MBR integration index, which is shown in the lower part of Table 9. From 1977 to 1998 the integration index displayed a steady increase. Note that the integration index is now better interpreted as an 'index of regional consolidation', reflecting the degree to which the two zones of the MBR form an interrelated economy, by fusing into a single region.

6. CONCLUSIONS

The main Israeli metropolis of Tel-Aviv (the M zone of the MBR) continues to have a decreasing relative share of national population and employment. In absolute terms, its population and employment the Tel-Aviv metropolis have increased relatively slowly, and in the last decade have reached a phase of stagnation. If such a picture reflects the exhaustion of agglomeration economies (i.e., the presence of agglomeration diseconomies) within the M zone, can this be expected to lead to greater geographic dispersion of population and economic activity throughout the nation? Or, might this result in the further development of the MBR, by which the M zone continues to extend its reach to the surrounding area? Preliminary analysis of the data for this Israeli example suggests that both questions may be answered in the affirmative. On the one hand, the MBR as a whole continues to lose its relative share of national population and employment. On the other hand, there are strong indications of a process of spatial reorganization, by which the decreasing share of the M zone in national population and employment is compensated to a large extent by an increasing share of the adjacent NM zone.

The process by which a MBR develops closely reflects the adoption of metropolitan features in the NM zone adjacent to the M zone. This begins with a decrease in the population of the high-cost M zone, and continues with an increase in employment within the MBR. The latter trend gives rise to an increase in centrality (employment at a higher level than that needed for the local workforce), an increase in attractiveness (more workers coming from other regions to work in the MBR), a decrease in dependence (fewer local workers having to commute to other regions), and an increase in integration (more workers commuting in both directions between the MBR and other regions). Despite the internal strengthening of the MBR, its share

of total national employment and (particularly) population continues to decrease. It therefore appears that the response to agglomeration diseconomies in the M zone in terms of deconcentration to the NM zone only represents a partial solution, and there is some evidence for a shift from the MBR to the other regions of the nation.

It is important to stress that the process of national deconcentration is not symptomatic of an economic downgrading of the Tel-Aviv MBR. Rather, the indications are that the onset of stabilization (in terms of population and employment) is associated with a strengthening of the economic role and influence of the MBR within the national economy. To a large extent, the MBR as a whole behaves as a single well-defined and integrated area. Intra-MBR fusion is increasing in terms of additional commuting between its two zones, and at the same time, the integration of the MBR with other regions is also increasing, largely in terms of the attraction of higher shares of external workers. This combination of a consolidating MBR on the one hand and national deconcentration of population and employment on the other, may be seen as one outcome of the tensions, discussed by Krugman (1999), between 'centripetal forces' and 'centrifugal forces'.

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